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# Matrix of GHG Reduction Policy Options in the Transportation and Land Use (TLU) Sector

The matrix below provides examples of policy options to reduce GHG emissions in the transportation and land use sector. The matrix is neither exhaustive, nor are the categories necessarily distinct. The main goal is to provide a starting point for this process. Initial priorities from Call #2 (9/14/05 are marked in yellow.

Included are some examples of current activities in Arizona that fit under various categories. Again this is not meant as an exhaustive list. The TLU group needs to account for policy developments related to SIPs for ozone and regional haze.

**Key to Indicators:** We will develop indicative results, as defined below, for potential emission reductions and costs of the options. These will be rough estimates based on experience or studies in Arizona or elsewhere and are intended to start off the TWG discussion of the priorities for analysis. Actual Arizona-based estimates will be developed for options that stakeholders decide to pursue in more detail, and may differ significantly from the preliminary indicators.

| **Indicative Potential Emission Reductions -** | **Indicative cost ($/tCO2e)** |
|---|---|
| **High (H):** Potentially capable of saving at least 1 Million Metric Tons CO2e per year by 2020 (~1% of current AZ emissions) | **High (H)**: $50/tCO2e or above |
| **Medium (M):** Potentially capable of saving from 0.1 to 1 Million Metric Tons per year by 2020 | **Medium (M):** $5-50/tCO2e |
| **Low (L):** Unlikely to yield more than 0.1 Million Metric Tons CO2e per year by 2020 | **Low (L):** $5/tCO2e or lower |
| **Uncertain (U):** Too many unknowns to hazard a guess | **Negative (Neg):** option yields net benefits |

*Several measures overlap in terms of the emissions they would reduce. They may target the same emissions sources, but using different implementation pathways. The estimates shown here will assume that measures would be implemented independently from, or instead, of other measures.*

**Indication of Priorities:**

- **High:** High priority items are deemed deserving of considerable further analysis.
- **Medium:** Medium priority items will be carried forward, with the extent of further consideration and analysis to be determined later.
- **Low**: Low priority items will be moved to a separate list as options to be potentially considered at a later time.

| | | Priority: High, Med, Low | Implement. Level & Lead | Potential Emission Reductions | Indicative Cost ($/tCO2 removed) | Other Information, Co-benefits, Feasibility Consideration, Examples of Current Activities (currently only includes the latter) |
|---|---|---|---|---|---|---|
| **1.** | **PASSENGER VEHICLE GHG EMISSION RATES** | | | | | |
| 1.1 | **Vehicle Technology** | | | | | |
| 1.1.1 | California GHG Emission Standards for Light-duty Vehicles | H | State | **H** | **L** | Opinions vary sharply on cost. Legal challenge pending. |
| 1.1.2 | California LEV-2 Emission Standards (option: w/ or w/out Advanced Technology Component) | Tbd | State | **L** | **L/M** | May be attractive as SIP option due to reduction in conventional air pollution |
| 1.1.3 | State R&D on Low-GHG Vehicle Technology (e.g., fuel cell) | L | State | **L** | **?** | Best coupled w/ federal dollars |
| 1.1.4 | Add-on Technologies (Low Friction Oil, Low-Rolling Resistance Tires) | M | State | **L** | **Neg/L** | |
| 1.2 | **Vehicle Operation** | | | | | |
| 1.2.1 | Enforce Speed Limits | M | State, local | **L** | **?** | |
| 1.2.2 | Vehicle Maintenance, Driver Training | M | State | **L** | **?** | |
| 1.2.3 | Transportation System Management | Tbd | State | **?** | **?** | |
| 1.3 | **Incentives & Disincentives** | | | | | |
| *1.3.1* | *Deleted: Procurement of Efficient Fleet Vehicles [moved to new 3.4]* | | | | | |
| 1.3.2 | Feebates (state-specific or regional) *[Charge a fee on purchases of relatively high-emitting vehicles and give a rebate on the purchase of relatively low-emitting vehicles. Overall, fees/rebates are revenue neutral.]* | M | State | **L/M** | **?** | Considered in many states but not adopted. |
| 1.3.3 | GHG-based registration fees | M | State | **L** | **?** | |
| 1.3.4 | Tax Credits for Fuel Efficient Vehicles | L | State | **L** | **?** | Federal tax code provides tax credits for alternative fuel vehicles |
| 1.3.5 | Vehicle Scrappage | L | State, local | **L** | **L/M** | Pilots undertaken in several cities. |

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|---|---|---|---|---|---|---|
| 1.3.6 | (Additional option, if/as suggested) | | | | | |
| **2.** | **LAND USE AND LOCATION EFFICIENCY** | | | | | |
| 2.1 | **General** ***[ Option: Treat these as options as a bundle]*** | | | | | |
| 2.1.1 | Infill, Brownfield Re-development | | State, local | **H** | **?** | Arizona Brownfields Cleanup Revolving Loan Fund, Prospective Purchaser Agreement |
| 2.1.2 | Transit-Oriented Development | | State, local | **H** | **?** | |
| 2.1.3 | Smart Growth Planning, Modeling, Tools | | State, local | **H** | **?** | Growing Smarter Act [1998], Growing Smarter Plus Act [2000], Growing Smarter Oversight Council |
| 2.1.4 | Targeted Open Space Protection | | State, local | **H** | **?** | |
| **3.** | **INCREASING LOW-GHG TRAVEL OPTIONS** | | | | | |
| 3.1 | **Increase Transportation Funding for Efficient Modes** | | | | | |
| 3.1.1 | Make full use of CMAQ funds | | State, local | **L** | **L** | AZ has 90% obligation rate. |
| 3.1.2 | Improve Transit Service (frequency, convenience, quality) | | State, local | **L** | **M/H** | ADOT public transit grant funds are targeted at rural and special needs users. |
| 3.1.3 | Transit Marketing and Promotion | | State, local | **L** | **?** | |
| 3.1.4 | Bike and Pedestrian Infrastructure | | State, local | **L** | **?** | ADOT Bike and Pedestrian Program www.azbikeped.org/ |
| 3.1.5 | Expand Transit Infrastructure (rail, bus, BRT) | | State, local | **L** | **H** | Light rail project approved for Phoenix-Mesa-Tempe [$1.3 billion / 20 miles]. Target date of 2008. |
| 3.1.6 | HOV lanes | | State, loca | **L** | **?** | |
| 3.1.7 | "Fix-it-First" *[Earmark transportation funds toward the repair of existing transportation network before funding new transportation infrastructure]* | | State, local | **L/M** | **?** | |

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|---|---|---|---|---|---|---|
| 3.1.8 | Transit Prioritization (signal prioritization, HOV lanes) | | State, local | **L** | **?** | |
| 3.1.9 | Telecommute and Live-Near-Your-Work | | State, local | **L** | **?** | See esp. Pima County's Voluntary No-Drive Day. A does some encouragement of telecommuting on ba air air quality days. |
| 3.1.10 | Car sharing | | Local | **L** | **?** | |
| 3.1.11 | E-Commerce | | State, local | **L** | **?** | |
| 3.2 | **Incentives & Disincentives** | | | | | |
| 3.2.1 | Employer-provided Commuter Incentives (transit passes, , vanpools, preferential parking) *[includes "Parking Cash Out" -- an employer that offers free parking also offers the parking subsidy in cash)* | | State, local, private firms | **?** | **?** | |
| 3.2.2 | VMT Tax *[tax on miles driven]* | | State | **L/M** | **?** | |
| 3.2.3 | Pay As You Drive Insurance *[part of a vehicle's insurance premium is determined by annual miles driven]* | | State, insurance companies | | | Revenue neutral to drivers as a whole |
| 3.2.4 | Increased Fuel Tax (w/ targeted use of revenue towards travel alternatives) | | State | **L** | **?** | |
| 3.2.5 | Location-Efficient Mortgages *[favorable mortgage terms reflecting lower cost-of-living in mixed-use communities near public transportation* | | State, mortgage providers | **L** | **?** | |
| 3.2.6 | Congestion Pricing (or tolls) (w/ targeted use of revenue towards travel alternatives) | | State, local | **?** | **?** | |
| 3.2.7 | Parking Pricing or Supply Restrictions | | Local | | | |
| 3.2.8 | Transit Pricing Incentives | | Local | | | |
| 3.2.9 | GHG Offset Requirements for Large Developments *[Require developer to offset GHG emissions attributable to a development]* | | Local | | | |

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|---|---|---|---|---|---|---|
| 3.2.10 | Benefits for Low GHG Vehicles (e.g., preferential parking, use of HOV lanes) | | Local, private firms | | | |
| 3.3 | **Fuel Measures** | | | | | |
| 3.3.1 | Low-GHG Fuel Standard (e.g., minimum ethanol or biodiesel content) | | State | **H** | **L/M** | |
| 3.3.2 | *Deleted: Low-GHG Fuel for State Fleets (e.g., ethanol, biodiesel, compressed natural gas (CNG), electric). Moved to 3.4.1.* | | | | | |
| 3.3.3 | Biofuel expansion (biodiesel, CNG, LPG, cellulosic ethanol) | | State, private firms | **M** | **L/M** | Some CNG bus expansion in public transit, school districts, and at airports |
| 3.3.4 | Expand Alternative Fuel Infrastructure Development (e.g. hydrogen, CNG) | | State, local | **L** | **n/a** | |
| 3.4 | **Fleet Vehicles – *NEW SUBSECTION*** | | | | | |
| 3.4.1 | Low-GHG Fuel for State Fleets (e.g., ethanol, biodiesel, compressed natural gas (CNG), electric) | | State | **L** | **L/M** | |
| 3.4.2 | Promote Low-GHG Fuel for Private Fleets | | State/local | **L** | **L/M** | |
| **4.** | **FREIGHT** | | | | | |
| 4.1 | **Vehicle Technology** | | | | | |
| 4.1.1 | Vehicle Technology Improvements (e.g., engines, aerodynamics) | | | **L** | **?** | New EPA emission standards for heavy-duty engines take effect in 2007. |
| 4.1.2 | Voluntary diesel retrofit program | | | **L** | **L/M** | See EPA National Clean Diesel Campaign |
| 4.1.3 | Low-sulfur diesel | | | **L** | **H** | New EPA fuel standards for low-sulfur diesel take effect in 2006. |
| 4.1.4 | Black carbon control technologies (e.g., use of particulate traps, other complementary technologies) | | State, local | **?** | **M** | Large co-benefits in PM reduction |

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|---|---|---|---|---|---|---|
| 4.2 | **Vehicle Operation** ***[ Option: Treat these as options as a bundle]*** | | | | | |
| 4.2.1 | Freight Logistics Improvements/GIS | | | | | |
| 4.2.2 | Enforce Speed Limits | | | | | |
| 4.2.3 | Improve Traffic Flow | | | | | |
| 4.2.4 | Increased Size & Weight of Trucks | | | | | |
| 4.2.5 | Pre-clearance at Scale Houses | | | | | |
| 4.2.6 | Promote Truck Stop Electrification *[reduces idling]* | | | | | |
| 4.2.7 | Enforce Anti-Idling | | | | | |
| 4.2.8 | Intermodal Freight Initiatives *[increase rail use through better intermodal connections]* | | | | | See e.g. EPA SmartWay program |
| 4.3 | **Incentives & Disincentives** | | | | | |
| 4.3.1 | *Deleted: Procurement of Fuel Efficient Fleet Vehicles (public, private or other) [combined w/ 3.4.2 above]* | | | | | |
| 4.3.2 | Incentives to Retire or Improve Older Less Efficient Vehicles | | | | | |
| 4.3.3 | Maintenance and Driver Training *[to improve fuel efficiency]* | | | | | |
| 4.3.4 | Increased Truck Tolls or Highway User Fees | | | | | |
| 4.4 | **Intercity Travel: Aviation, High Speed Rail, Bus** | | | | | |
| 4.4.1 | *Deleted: High-speed Rail [combined with 3.1.5]* | | | | | |
| 4.4.2 | Integrated Aviation, Rail, Bus Networks | | | | | |
| 4.4.3 | Aircraft emissions *[improved operation of aircraft and runway management]* | | | | | |
| 4.4.4 | Use of Alternate Fuels in Airport Ground Equipment | | | | | |

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|---|---|---|---|---|---|---|
| 4.5 | **Off-Road Vehicles (construction equipment, out-board motors, ATVs, etc)** | | | | | |
| 4.5.1 | Incentives for Purchase of Efficient Vehicles/Equipment | | | | | |
| 4.5.2 | Improved Operations, Operator Training | | | | | |
| 4.5.3 | Maintenance Improvements | | | | | |
| 4.5.4 | Increased Use of Alternative Fuels or Low Sulfur Diesel | | | | | |